Chronic non-specific lung disease in Curacao

Westermann, Cornelis Jacobus Johannes

SUMMARY

The present thesis concerns a cross-sectional epidemiological survey conducted in Curaçao, the Netherlands Antilles. The main objective of the survey was to study the relationship between social class and exposure to industrial airpollution on the one hand and the presence of symptoms and signs of chronic non-specific lung disease (CNSLD) on the other hand. For this purpose the male and female population aged 20-45 yrs. was investigated in three districts:

- a non-polluted district with fair socio-economic circumstances (Domingitu)
- a polluted district with unfavourable socio-economic circumstances (Wishi)
- a non-polluted district with unfavourable socio-economic circumstances (Kanga)

Definitions of asthma, chronic bronchitis, emphysema and CNSLD, covering the entire group of diseases, are given in chapter 1; for epidemiological purposes the respiratory symptoms of CNSLD are defined in detail.

A review of the literature concerning the exogenous and endogenous factors possibly involved in the pathogenesis of CNSLD is given in chapter 2. The reviewed literature concerns primarily epidemiological studies and studies of factors of special interest for CNSLD in Curaçao.

The exogenous factors that are considered are smoking, airpollution, occupational pollution, "natural" pollution, weather, social class and respiratory infections.

The discussed endogenous factors are classified as unidentified hostfactors (sex, age and race) and identified hostfactors (alpha$_1$-antitrypsine deficiency, immuno-deficiency, hormons, imbalance of the autonomic nervous system, hyperreactivity of the bronchial tree, allergy and anatomical changes).

The data of the reviewed literature are subsequently combined in a personal concept of the pathogenesis of CNSLD in adults. It is suggested that, in the interaction of host and environment, environmental factors are of paramount importance in the pathogenesis of chronic cough and phlegm (chronic bronchitis), whereas hostfac-

tors seem to determine largely who is at risk of developing chronic airway-obstruction.

The review of the literature is concluded in chapter 3 with a brief consideration of epidemiological methods in the study of CNSLD and the presentation of data about the prevalence of respiratory symptoms in various countries (text-table 3.3.1.).

In chapter 4 an outline of Curaçao, the Curaçaoans and health and disease in Curaçao is given. The available data about the pathogenetic factors discussed in chapter 2 are presented. It appears that all these factors are present in the environment and in the largely negroid population of this tropical island. Yet the manifestations of CNSLD seem to be different as compared with white populations in temperate climates: "asthma" is common, whereas "chronic bronchitis" and "emphysema" are rarely encountered.

In chapter 5 the objectives, methods, population and realization of the survey are described. The investigation consisted of an interview for respiratory symptoms (MRC-ECCS-questionnaire), physical and röntgenological examination of the chest, measurement of the bloodpressure, pulmonary function studies (VC, FEV_1, FEV_1%VC, MMF, histamine-threshold), electrocardiogram, allergic skintesting, and eosinophilic leucocyte count of capillary blood.

In chapter 6 the problems that have been encountered are described. Apart from practical problems a low attendance rate (61%) and observer-bias have been major difficulties.
The available information about the absentees suggests that employment, pregnancy, family-care and unwillingness have been major reasons for absenteism. In a random sample of absentees a high prevalence of chronic cough and phlegm and a low prevalence of dyspnea and wheezing is found, as compared with the attendants. (table 8).
Because of interviewer-bias (table 10) the results of the interview have to be analysed per interviewer-population. The prevalence of other diseases, capable of producing symptoms mimicking CNSLD, appears to be low with the exception of obesity. A significant association between obesity and the prevalence of dyspnea is found (table 13).

In chapter 7 the results of the interview obtained by the three main interviewers in 4011 individuals are presented (basic tables 1-32, tables 16-33). Summarizing tables (text-tables) have been included in the text.

In chapter 8 the results of the objective investigation in 4596 individuals are shown (tables 34-46).

In chapter 9 the results are analysed taking into consideration the restrictions resulting from the problems described in chapter 6. The following is concluded:

1. The prevalence of chronic cough and phlegm is low, and the prevalence of wheezing on most days and/or nights is high in Curaçao as compared with white populations in temperate climates (summary-table). This may be the result of racial and meteorological factors. It is felt that the high prevalence of dyspnea in Curaçao is in part the result of obesity, whereas psychological factors and a different understanding or awareness may be contributing factors. Dyspnea is not a reliable indication of the presence of an abnormal pulmonary condition in Curaçao. Wheezing may be a better indication.

Summary-table: Prevalence of respiratory symptoms in males and females.

Respiratory symptoms	males %	females %
chronic cough	4.8	4.3
chronic phlegm	7.1	5.3
chestillness	10.1	7.7
dyspnea grade 2 or more	13.6	28.1
dyspnea grade 3 or more	5.5	14.3
wheezing grade 1 or more	17.7	14.2
wheezing grade 2 or more	16.6	13.6
asthmatic attacks	2.4	2.0

2. A significant association was found between exposure to industrial airpollution and the prevalence of chronic cough and wheezing, despite the fact that some arguments were found for selective emigration from the polluted district (text-table 7.3.4.1., 7.3.4.2.). Smokers appear to be particularly susceptible.
Pulmonary function was poorest in the polluted district (text-table 8.1.2.2.).

3. Low social class was associated with a high prevalence of dyspnea (text-table 7.3.5.2.1.), and poor housing-conditions with a high prevalence of chronic cough and dyspnea (text-table 7.3.5.3.).
In Kanga more chestillness in the past three years (text-table 7.3.5.1.), skinallergy, hyperreactivity of the bronchial tree, abnormal findings on auscultation of the lungs and a poorer pulmonary function were found than in Domingitu (tables 37-46).
Selective migration may have contributed to this difference.

4. A highly significant association was found between smoking and the prevalence of chronic cough and phlegm (males only), one or more chestillnesses in the past three years, dyspnea grade 2 or more, dyspnea grade 3 or more (females only), and wheezing on most days and/or nights (text-table 7.3.3.1.). No significant influence of smoking on pulmonary function was detectable with the use of simple pulmonary function tests (text-table 8.1.2.1.).

5. No "true" age-effect or interaction between age and exposure to adverse exogenous factors was found as far as respiratory symptoms are concerned (tables 17A and B). The studied population is relatively young (20-45 yrs.). Skinallergy decreased with aging (table 40).

6. The greater susceptibility to hypersecretion, higher prevalence of wheezing, and greater proportion of individuals with skinallergy and abnormal findings on auscultation of the lungs in the men possibly reflect the presence of a true endogenous risk factor.
The difference between the sexes is less marked than in other studies. This is probably the result of the relatively young age of the studied population, and the greater exposure to the adverse factors associated with residence of Curaçao women than Curaçao men.

The results of the present study have implications for future population-surveys in Curaçao and indicate several items, which require further investigation.

1. The low attendance rate indicates that future population-surveys in Curaçao with the objective of establishing the prevalence of disease or symptoms should be directed to occupational or institutional groups.

2. Selfcompletion-questionnaires are preferable in Curaçao, unless either one or many interviewers are employed. The sequential investigation of populations to be compared may introduce errors that are difficult to account for and should be avoided whenever possible.

3. Selective migration from polluted Wishi to non-polluted districts, in the past and at present, is an objective for further investigation.

4. The high frequency of skinallergy in Kanga requires further study.

5. Racial hostfactors may be important determinants of the natural history of CNSLD. These factors should be studied e.g. by comparison of the identified hostfactors in racial groups exposed to the same environmental hazards.

6. The significant association between poor housing-conditions and the prevalence of chronic cough and dyspnea requires a more elaborate analysis; since detailed questions about housing-conditions were asked during the survey, this analysis can be carried out with the available data.